

**PLASMA IMMERSION ION IMPLANTATION APPARATUS INCLUDING A
CAPACITIVELY COUPLED PLASMA SOURCE HAVING LOW DISSOCIATION
AND LOW MINIMUM PLASMA VOLTAGE**

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ABSTRACT

A plasma immersion ion implantation reactor for
implanting a species into a workpiece includes an enclosure
10 which has a side wall and a ceiling defining a chamber, and
a workpiece support pedestal within the chamber for
supporting a workpiece having a surface layer into which the
species are to be ion implanted, the workpiece support
pedestal facing an interior surface of the ceiling so as to
15 define therebetween a process region extending generally
across the diameter of the wafer support pedestal. The
reactor further includes an RF plasma source power generator
connected across the ceiling or the sidewall and the
workpiece support pedestal for capacitively coupling RF
20 source power into the chamber. A gas distribution apparatus
is provided for furnishing process gas into the chamber and
a supply of process gas is provided for furnishing to the
gas distribution devices a process gas containing the
species. An RF bias generator is connected to the workpiece
25 support pedestal and has an RF bias frequency for
establishing an RF bias.

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